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North Carolina Statewide Technical Architecture

Platform Domain

STATEWIDE TECHNICAL ARCHITECTURE

Platform Domain

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Platform - Platform Architecture

Principle 7.00.01 Design servers with bias toward granularity in physical servers.

Rationale:

- ❑ Using multiple servers from the same vendor with the same operating system release is cost effective because a group of uniform servers is easier to manage and integrate across a wide geographic area and multiple agencies.
- ❑ A highly granular, loosely-coupled server design supports modular application code sets in an N-Tiered application architecture.

Platform - Platform Architecture

Principle 7.00.02 Design mission critical systems without a single point of failure.

Rationale:

- ❑ Distributed systems can be designed to be extremely robust.
- ❑ Small granular servers make it easier to replicate services for increased availability.
- ❑ Systems should be designed to permit continued operations, albeit at reduced throughput, when a server fails in normal operations or in the event of a disaster.

Platform - Platform Architecture

Principle 7.00.03 Design all servers implementing a particular application, application suite, or tier within an application with binary compatibility.

Rationale:

- ❑ With binary compatibility, there would be no need to recompile an application for different platforms. For example, if an application that is going to be deployed on servers located in employment security offices all servers running that application should be binary compatible -- this must be ensured even if the platforms are from the same manufacturer. The platforms must run the same version of the operating system and must not require any recompilation of the line of business application to deploy from one office to another.
- ❑ Total binary compatibility will support automated software distribution across servers and associated strategies which reduce support costs and provide stable computing platforms that can be reliably shared across agencies.

Platform - Platform Architecture

Principle 7.00.04 Utilize open, vendor-neutral systems standards, whenever possible.

Rationale:

- ❑ Open, vendor-neutral system standards provide flexibility and consistency that will allow agencies to respond more quickly in an environment of changing business requirements.
- ❑ Vendor-neutral systems support economic and implementation flexibility.
- ❑ Vendor-neutral systems also protect the state against unexpected changes in vendor strategies and capabilities.

Platform - Platform Architecture

Principle 7.00.05 Design servers to allow multi-tasking and multi-threading.

Rationale:

- ❑ Multi-tasking achieves better CPU utilization.
- ❑ Multi-threaded processing enable a server to respond to multiple user requests more efficiently.
- ❑ These features also facilitate session management. Fewer sessions to manage provides a more scaleable solution. Multi-threading usually provides capability to execute more sessions ie, more users can run the same application simultaneously, or several threads of the same application can run simultaneously. The ability to run more session or threads would demonstrate a more scaleable solution.

Platform - Platform Architecture

Principle 7.00.06 Design servers to be field upgradeable.

Rationale:

- ❑ Rapid changes in business processes are enabled in part by implementing a platform technical infrastructure that exceeds the immediate application requirements. This means agencies should purchase servers with larger chassis so they are able to be expanded more easily and cost effectively.
- ❑ Field upgradeable servers provide maximum flexibility and adaptability for growth and new functionality.

Platform - Platform Architecture

Principle 7.00.07 Make platform decisions based on long-term business needs.

Rationale:

- ❑ Picking a platform to run a specific purchased application to meet a specific business need may not support long-term state and local agency requirements. In addition, investment in short-term solutions that do not migrate easily to a strategic platform can ultimately be more costly and time consuming than investing in a strategic platform initially.
- ❑ Cooperative efforts among agencies and local government to cross-utilize platform incorporating the state's recommended platform technology components may provide the most cost-effective solution. File and print servers, for example, can easily be implemented as shared resources.

Platform - Server Platform

Best Practice 7.01.01 Run mid-range application and database servers on a 32-bit multi-tasking, multi-threaded operating system, at a minimum.

Rationale:

- ❑ Migration from 16-bit operating system platforms to 32- or 64-bit operating system platforms will support faster processing, access to more memory, and better memory and process management.
- ❑ In an N-tiered client/server environment, speed, memory capacity, and memory and process management become increasing important as processing is distributed across platforms.

- ❑ The 32- and 64-bit operating systems provide more stable, reliable platforms in an N-tiered, distributed client/server environment.

Platform - Server Platform

Standard 7.01.01 Run Distributed application server on platforms supporting "open" operating systems.

Rationale:

- ❑ Open operating systems are available from multiple vendors, such as Unix
- ❑ Open operating systems run on hardware available from multiple vendors, such as Windows NT.
- ❑ Open operating systems are in the public domain, but have significant industry support, such as Linux.

Platform - Server Platform

Best Practice 7.01.02 For reliability and ease of support, place each major application on a uniformly configured server. This may require that each major application be implemented on its own server.

Rationale:

- ❑ Use the same reference configuration of these servers. Important items to consider when planning for consistency include using the same versions of network software, using the same network hardware cards, etc.
- ❑ Tuning performance through configuration changes can make overall maintenance more difficult. In the long run, it may be less expensive to buy more powerful hardware than it is to spend time on individualized tuning and maintenance.
- ❑ The Network Operating System should be considered a major application and run on its own platform.

Platform - Server Platform

Standard 7.01.02 Make sure server platforms are POSIX compliant.

Rationale:

- ❑ POSIX is an IEEE standard design to facilitate application portability and interoperability. This facilitates movement of applications from one platform to another if needed.

Platform - Server Platform

Standard 7.01.03 Make sure server platforms comply with third party certifications.

Rationale:

- ❑ Third party certifications foster quality product purchases from manufacturers that have demonstrated abilities to deliver and support these products.

Platform - Server Platform

Best Practice 7.01.03 Consider normal anticipated future application growth when determining capacity requirements for server platforms.

Rationale:

- ❑ A server platform should be purchased that will accommodate the current demand as well as support anticipated normal growth without requiring the purchase of a new server chassis.
- ❑ Rather than purchase a fully configured server, purchase the next larger size platform to allow for expansion. This will permit upgrades to an existing platform to accommodate growth rather than forcing the purchase of another machine.

Platform - Server Platform

Standard 7.01.04 Use NetWare Directory Services (NDS) for directory services. File and print can use NOS services on Local Area Networks (LANs).

Rationale:

- ❑ Directory services are a key component of the enterprise's infrastructure. Standards are being developed for enterprise directory services. NDS is widely available and a useful interim standard affording an easy migration path should it be necessary.
- ❑ There is an immediate and continuing demand for the purchase and installation of Local Area Networks (LAN) operating systems or file systems. Although statewide standards for such system components are being developed, they are part of a larger, more complex specifications. In the interim, consistency among immediate purchases, such as NDS, eases the burden of maintenance, may reduce the purchase costs, and will greatly simplify migration to the new standard when it is in place.
- ❑ For more information on directory services, see the Groupware Domain of the Statewide Technical Architecture.

Platform - Server Platform

Best Practice 7.01.04 Balance business adaptability and ease of systems management with server platform choices. However, when there is a conflict between business adaptability and ease of systems management, the business requirements should have highest priority.

Rationale:

- ❑ These two goals will always be in conflict.
- ❑ The primary design point of the technical architecture is to provide for change in business operations and its supporting applications. Therefore, even though it is easier to manage a large server rather than multiple smaller servers, the business need to provide flexibility should take precedence over any marginal increases in operational costs.

Platform - Server Platform

Standard 7.01.05 Servers must be secured in such a way as to ensure security, availability and reliability.

Rationale:

- ❑ Application servers run the state's business. They must be physically secure, reliable and available for processing. In order to ensure this, the following are requirements for servers:
- ❑ They must have UPS with a battery backup sufficient to meet the minimum up-time as described by the data criticality.
- ❑ Access should be restricted to authorized personnel only.
- ❑ Must meet security policy standards.

Platform - Server Platform

Standard 7.01.06 Servers must be secured in such a way as to ensure security, availability and reliability.

Rationale:

- ❑ They must have UPS with a battery backup sufficient to meet the minimum up-time as described by the data criticality.
- ❑ UPS should be capable of issuing a warning and optionally call via a page the responsible personnel.
- ❑ Access should be restricted to authorized personnel only.
- ❑ Must meet security policy standards.

Platform - Client Platform

Best Practice 7.02.01 Use open standards based host-controlled client platforms where standards exist.

Rationale:

- ❑ Choose a device and host software that is already in use elsewhere in the enterprise. For example, the Department of Motor Vehicles is using PDF417 for 2-d bar codes. Unless significant business reasons exist for other choices, use the PDF417 coding standard
- ❑ Consider other potential uses for the device and host software in the enterprise.

Platform - Client Platform

Standard 7.02.01 Two-dimensional (2-d) bar codes should use PDF417 coding standard.

Rationale:

- ❑ The PDF417 bar code standard is used by the Department of Motor Vehicles. It is capable of storing data such as product information, maintenance schedule, shipping information for others.

Platform - Client Platform

Best Practice 7.02.02 Ideally, client platform choices should satisfy both end-user ease-of-use and ease of systems management. When there is a conflict between end-user ease-of-use and ease of systems management, give priority to end-user needs.

Rationale:

- ❑ It would simplify systems management to standardize on a particular platform; however, application software is often available only for particular client platforms. Apple, for example, supplies software

for education; Unix provides engineering packages, etc. Supporting the business needs of end users is most important.

Platform - Client Platform

Standard 7.02.02 Platforms must comply with third party certifications.

Rationale:

- ❑ Client platforms must comply with third party certifications as specified.
- ❑ Unix: Manufacturer is ISO 9002 Certified, XPG4 Branded UNIX 93
- ❑ Microcomputers: Manufacturer is ISO 9002 certified, Gartner Group Tier 1 or Tier 2 classified.

Platform - Client Platform

Standard 7.02.03 ISO 7816 Smart Card standards for contact smart cards.

Rationale:

- ❑ See Security and Network Architecture standards for details.

Platform - Client Platform

Best Practice 7.02.03 Choose client platforms that support personal productivity and connectivity. This may require multiple client configurations to support business needs.

Rationale:

- ❑ A line of business application may have a variety of users with different client platform requirements. A financial department may use Windows 95 because of the availability of accounting applications while an engineering department may require UNIX because of the availability of CAD/CAM software.
- ❑ If personal productivity applications are run on the desktop, a 32-bit or 64-bit operating system is required. Migration from 16-bit operating system platforms to 32- or 64- bit operating system platforms supports faster processing, access to more memory, and better memory and process management. The 32- and 64- bit operating systems provide more stable, reliable platforms in an N-tiered, distributed client/server environment thus reducing the number of system crashes caused by lack of client resources. In addition, 64-bit operating systems provide better performance for process intensive applications such as multi-media and engineering (CAD) applications.

Platform - Client Platform

Best Practice 7.02.04 The client platform displays the interface to an application. In the design of applications, minimize dependency on a particular client platform as much as possible.

Rationale:

- ❑ Web browsers support multiple platforms.
- ❑ 3-tier and N-Tier application architectures, using "thin" clients, reduces dependence on a particular client platform because the user interface is isolated from application code (see the Application Architecture Domain).

Platform - Client Platform

Standard 7.02.04 ISO 14443A and Mifare Smart Card standards for contactless smart cards.

Rationale:

- ❑ See Security and Network Domain for details.

Platform - Client Platform

Standard 7.02.05 Avoid Proprietary smart card reader-side APIs.

Rationale:

- ❑ No standards exist for smart card reader-side APIs for application and platform integration. Use reader-side APIs from established platform vendors, such as PC/SC for the windows environment or use APIs that strictly adhere to the ISO 7816/4 command set.
- ❑ See Security and Network standards for more details.

Platform - Client Platform

Standard 7.02.06 Standards for Operating Systems will be covered in a later release of this chapter.

Rationale:

- ❑ Operating systems standards will be covered in a later release.